IN THE CLAIMS

Please amend the claims as shown in the following complete listing:

1. (Canceled)

2. (Currently Amended) A linear compressor (100) applicable to a cooling system (20), the linear compressor (100) comprising<u>:</u>

a piston (1) driven by a linear motor (10), the piston (10) having a displacement range controlled by a controlled electric voltage (V_M), the controlled electric voltage (V_M) having a voltage frequency (F_{VM}) applied to the linear motor (10) and adjusted by a processing unit (22), <u>wherein the controlled voltage (V_M) generates a feed current (i_A) that circulates in the linear motor (10);</u>

wherein the processing unit (22) of the linear compressor (100) ~~is configured to~~ dynamically control<u>s</u> the range of piston (1) displacement as a function of the variable demand of the cooling system (20), the linear compressor (100) having a resonance frequency,

~~and~~ wherein the processing unit (22) adjusts a range of piston displacement so that the linear compressor (100) ~~will be~~ <u>is</u> dynamically kept in resonance throughout ~~the~~ variations in demand of the cooling system, the control of the displacement of the piston being made by means of the controlled voltage (V_M) that is adjusted by means of a variable frequency inverter, the inverter dynamically adjusting the voltage frequency (f_{VM}) of the controlled voltage (V_M) to a value equal to the value of the resonance frequency of the linear compressor (100) [[,]] as the variations in demand of the cooling system (20) occur, <u>wherein:</u>

<u>said processing unit (22) measures a feed phase (ϕ_C) of the feed current (i_A) and the dynamic phase (ϕ_P) of the piston (1) of the linear compressor (100), and</u>

<u>said processing unit (22) measures a difference between the feed phase (ϕ_C) and the dynamic phase (ϕ_P) and establishes a measured phase (ϕ_{PC}) according to</u>

<u>measured phase (ϕ_{PC}) = dynamic phase (ϕ_P) – feed phase (ϕ_C)</u>

<u>said processing unit (22) adjusts the controlled voltage (V_M) so that the value of the</u>

measured phase (ϕ_{PC}) will be null;

said range of piston displacement is adjusted according said variations in demand of the cooling system, wherein said variations in demand are detected by changes in said resonance frequency of said linear compressor (100) as indicated by changes in said measured phase (ϕ_{PC}), without reference to an external variable.

3. (Canceled)

4. (Currently Amended) A linear compressor according to ~~claim 3~~ claim 2, wherein the controlled voltage (V_M) is decreased when the value of measured phase (ϕ_{PC}) is positive and increased when the measured phase (ϕ_{PC}) is negative.

5. (Previously Presented) A linear compressor according to claim 4, wherein the feed phase (ϕ_C) is obtained from a pre-defined moment of the feed current (i_A).

6. (Previously Presented) A linear compressor according to claim 5, wherein the pre-defined moment of the feed current (i_A) is the passage of the feed current (i_A) by zero.

7. (Previously Presented) A linear compressor according to claim 6, wherein the pre-defined moment is obtained at the middle point of the duration of the feed current (i_A) at zero.

8. (Previously Presented) A linear compressor according to claim 7, wherein the dynamic phase (ϕ_P) is obtained from a signal of piston (1) displacement (DP).

9. (Previously Presented) A linear compressor according to claim 8, wherein the value of the dynamic phase (ϕ_P) is obtained by means of a displacement sensor (30) electrically associated to the processing unit (22).

10. (Previously Presented) A linear compressor according to claim 9, wherein the value of the dynamic phase (ϕ_P) is obtained from the position of piston (1) displacement (DP).

11. – 17. (Canceled)

18. (Currently Amended) A cooling system (20) comprising a linear compressor (100), the cooling system (20) comprising an on/off thermostat actuating the linear compressor (100),

the linear compressor (100) comprising a piston (1) driven by a linear motor (10)

the piston (1) having a displacement range controlled by means of a controlled voltage (V_M), the controlled voltage (V_M) having a voltage frequency (f_{MV}) applied to the linear motor (10) and adjusted by a processing unit (22),

wherein:

the range of piston (1) displacement is dynamically controlled as a function of a variable demand of the cooling system (20) during the period when the thermostat turns on the linear compressor (100),

the linear compressor (100) ~~has~~ <u>comprising</u> a resonance frequency, the processing unit adjusting the range of piston (1) displacement so that the linear compressor (100) will be dynamically kept in resonance throughout the variations in demand of the cooling system (20), and wherein

the displacement of the piston is adjusted through the controlled voltage (V_M) by means of a variable frequency inverter, the inverter dynamically adjusting the voltage frequency of the controlled voltage (V_M) to a value equal to the resonance frequency of the linear compressor (100) [[,]] as the variations in demand of the cooling system (20) occur<u>;</u>

<u>wherein said processing unit (22) measures a feed phase (ϕ_C) of the feed current (i_A) and the dynamic phase (ϕ_P) of the piston (1) of the linear compressor (100), and</u>

<u>wherein the processing unit (22) measures a difference between the feed phase (ϕ_C)</u>

and the dynamic phase (ϕ_P) and establishes a measured phase (ϕ_{PC}) according to

measured phase (ϕ_{PC}) = dynamic phase (ϕ_P) – feed phase (ϕ_C)

the processing unit (22) adjusting the controlled voltage (V_M) so that the value of the measured phase (ϕ_{PC}) will be null;

said range of piston displacement is adjusted according said variations in demand of the cooling system, wherein said variations in demand are detected by changes in said resonance frequency of said linear compressor (100) as indicated by changes in said measured phase (ϕ_{PC}), without reference to an external variable.

19. (Currently Amended) A linear compressor (100) controlling system, the system comprising a processing unit (20) measuring a range of piston (1) displacement and the processing unit adjusting the range of the piston (1) displacement to dynamically keep the linear compressor (100) in resonance throughout ~~the~~ variations in demand of the cooling system (20), the processing unit (20) adapted to measure a feed phase (ϕ_C) of a feed current (i_A) and a dynamic phase (ϕ_P) of the piston (1) of the linear compressor (100),

the processing unit (22) measuring the difference between the feed phase (ϕ_C) and the dynamic phase (ϕ_P) and establishing a measured phase (ϕ_{PC}) according to the following equation,

measured phase (ϕ_{PC}) = dynamic phase (ϕ_P) – feed phase (ϕ_C)

the processing unit (22) adjusting the controlled voltage (V_M) so that the value of the measured phase (ϕ_{PC}) will be null so that the linear compressor will be kept in resonance throughout the variations in demand of the cooling system;

the displacement of the piston being adjusted through the controlled voltage (V_M) by means of a variable frequency inverter, the inverter dynamically adjusting the voltage frequency of the controlled voltage (V_M) to a value equal to the resonance frequency of the linear compressor (100) [[,]] as the variations in demand of the cooling system (20) occur;

said range of piston displacement is adjusted according said variations in demand of the cooling system, wherein said variations in demand are detected by changes

<u>in said resonance frequency of said linear compressor (100) as indicated by changes in said measured phase (ϕ_{PC}), without reference to an external variable</u>.